PLID 01501

CITY OF PHILADELPHIA
DEPARTMENT OF PUBLIC HEALTH
AIR MANAGEMENT SERVICES

PLAN APPROVAL

Approval No: 15253
Plant ID: 01501

Date: September 22, 2016

Source: Philadelphia Energy Solutions (PES) Refining and Marketing LLC
Location: 3144 Passyunk Ave
Philadelphia, PA 19145

Owner: Philadelphia Energy Solutions (PES)
Mailing Address: 3144 Passyunk Ave
Philadelphia, PA 19145
Attention: Charles D. Barksdale Jr.
Environmental Manager

Pursuant to the provisions of Title 3 of the Philadelphia Code, the Air Management Code of February 17, 1995, as amended, and after due consideration of an application received under the rules and regulations of the Philadelphia Air Pollution Control Board, the City of Philadelphia, Department of Public Health, Air Management Services (AMS) on **September 22, 2016** approved plans for the modification, installation, and operation of the air contamination source(s) described below for the Tier 3 Project.

The Tier 3 Projects will make several operational and process changes to comply with the U.S.E.P.A. Tier 3 gasoline standards. The changes will allow PES to meet the regulatory standards by performing additional sulfur-removal from finished gasoline, straight run naphtha, and other gasoline blending streams currently generated and processed at the refinery. The changes are not expected to provide for increased net production of gasoline, but rather will provide more intensive processing of existing refinery streams.

Plan Approval No. 15253:

1. The modifications to the Unit 864 Naphtha Hydrotreating Unit will include the following:
    - Re-piping and piping sweet naphtha to tankage.
    - Replacement-in-kind of approximately the top half of tower OPV-38.
    - Replacing the existing burners with Low NOx Burners (LNB) and adding firing rate limits to Unit 864 PH-1 (613,200 MMBTU/year), Unit 864 PH-7 (332,880 MMBTU/year), Unit 864 PH-11 (508,080 MMBTU/year), and Unit 864 PH-12 (551,880 MMBTU/year).
2. The modifications to the Unit 870 Low Sulfur Gasoline (LSG) Unit will include the following:

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• Install a new splitter tower between the reactors where splitter tower light ends will go to gasoline blending while the splitter tower bottoms will be further desulfurized within the unit. • Adding pumps and rerouting pipes. • Installing new heat exchangers.
3. The modifications to the Unit 1332 hydrobon reactor system will include the following: • Rerouting the hydrobon stripper bottoms to the sweet naphtha storage tanks. • Rerouting the pre-fractionator overhead to the Unit 1232 FCCU Debutanizer feed for recovery in the existing unit recovery section. • Adding/replacing valves, pumps and rerouting pipes. • Installing new heat exchangers.
4. Install Unit 870 H-3 Heater (91.0 MMBTU/hr). The heater will burn refinery fuel gas or natural gas. The installation will include the following: • 870 H-3 Heater is an idle unit from the former Sunoco Inc. (R&M) Eagle Point Refinery in New Jersey and is equipped with ultra-low NOx burners (ULNB). • Install a new H_2S CEMs to demonstrate compliance with the 40 CFR 60.104(a)(1) emission limit to be used for all three 870 Unit Heaters. • Install fugitive equipment components such as valves, pressure relief devices, and flanges/connections associated with the project modifications

This Plan Approval expires on **March 22, 2018.** If modification has not been completed by this date, an application for either an extension or a new plan approval must be made. The conditions in this plan approval will remain in effect until they are incorporated in an operating permit.

The sources covered by this plan approval are subject to the conditions prescribed in the attachment. Wherever a conflict occurs between this Plan Approval and operating permit, construction permit, or any local, state, and federal regulations, the Permittee, shall in all cases, meet the more stringent requirement.

10/7/16 – Corrects error in Condition 12(d).

9/22/16

Edward Wiener
Chief, Source Registration

1. Each combustion device, piping, pumps, valves, or control device shall be installed, maintained, and operated in accordance with the manufacturer's specifications and the specifications in the application (as approved herein).

2. The Permittee shall comply with the following requirements of 25 PaCode 127.206:
   (a) PES shall secure the appropriate ERC which are suitable for use at the specific facility. The ERC shall be properly generated, certified by the PADEP and processed through the registry no later than the date approved for commencement of operation of the proposed new or modified facility. [25 Pa Code §127.206(d)]
   (b) PES may not commence operation of the new equipment or increase emissions until 45.1 tons of NOx offsets (34.7 tons of NOx emissions at 1.3:1 ratio and 38.1 tons of VOC or equivalent pollutant offsets (29.3 tons of VOC emissions at 1.3:1 ratio) are certified and registered by the Pennsylvania Department of Environmental Protection (PADEP). [25 Pa Code §127.206(d)(2)]

Emission and Operation Limits

3. PES may not permit the emission into the outdoor atmosphere of visible air contaminants in such a manner that the opacity of the emission is either of the following: [25 Pa Code §123.41]
   (a) Equal to or greater than 20% for a period or periods aggregating more than three (3) minutes in any one hour.
   (b) Equal to or greater than 60% at any time.

4. Carbon Monoxide (CO) emissions for fuel combustion unit may not exceed 1% by volume of exhaust gases. [AMR VIII, Section II]

5. Emissions from the 864 PH-7 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 864 Naphtha Hydrotreating Unit listed above including the installation of LNB are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
864 PH-7	NOx Emissions	(a) NOx emissions shall not exceed 0.06 lb/MMBtu higher heating value basis determined by the average of three stack test runs.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
		(b) NOx emissions shall not exceed 9.99 tons per rolling 12 month period.	Application. Compliance determination shall be an AMS approved stack test.
	CO emissions	(c) CO emissions shall not exceed 13.59 tons per rolling 12 month period.	Application. Initial compliance demonstration shall be demonstrated by an AMS approved stack test.

	Operation al Limits	(d) Firing duty shall not exceed 45.5 MMBTU/hr on a daily basis. (e) Firing duty shall not exceed 332,880 MMBtu per rolling 365-day period.	Application.

6. Emissions from the 864 PH-1 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 864 Naphtha Hydrotreating Unit listed above including the installation of LNB are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
864 PH-1	NOx emissions	(a) NOx emissions shall not exceed 0.06 lb/MMBtu based on the average of three stack test runs.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
		(b) NOx emissions shall not exceed than 18.40 tons per rolling 12 month period.	Application
	CO emissions	(c) CO emissions shall not exceed 25.04 tons per rolling 12 month period.	Application. Initial compliance demonstration shall be demonstrated by an AMS approved stack test.
	Operation al Limits	(d) Firing duty shall not exceed 80.0 MMBtu/hr on a daily average basis.	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94 for (d).
		(e) Firing duty shall not exceed 613,200 MMBtu per rolling 365-day period.	Application

7. The 864 PH-11 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 864 Naphtha Hydrotreating Unit listed above including the installation of LNB are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
864 PH-11	NOx emissions	(a) NOx emissions shall not exceed 0.06 lb/MMBtu based on the average of three stack test runs.	Application. Compliance shall be demonstrated by an AMS-approved stack test.

		(b) NOx emissions shall not exceed 15.24 tons per rolling 12 month period.	Application
	CO emissions	(c) CO emission shall not exceed 20.75 tons per rolling 12 month period.	Application. Initial compliance demonstration shall be demonstrated by an AMS approved stack test.
	Operational Limits	(d) Firing duty shall not exceed 74.0 MMBtu/hr on a daily average basis.	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94 for (d).
		(e) Firing duty shall not exceed 508,080 MMBtu per rolling 365-day period.	Application

8. The 864 PH-12 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 864 Naphtha Hydrotreating Unit listed above including the installation of LNB are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
864 PH-12	NOx emissions	(a) NOx emissions shall not exceed 0.06 lb/MMBtu based on the average of three stack test runs.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
		(b) NOx emissions shall not exceed 16.56 tons per rolling 12 month period.	Application.
	CO emissions	(c) CO emissions shall not exceed 22.54 tons per rolling 12 month period.	Application. Initial compliance shall be demonstrated by an AMS-approved stack test.
	Operational Limits	(d) Firing duty shall be less than 85.1 MMBtu/hr on a daily average basis.	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94 for (d).
		(e) Firing duty shall not exceed 551,880 MMBtu per rolling 365-day period.	Application

9. The 870 H-1 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 870 LSG Unit listed above including the installation of the new splitter tower is complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
870 H-1	NOx emissions	(a) NOx emissions shall not exceed 0.035 lb/MMBtu based on the average of three stack test runs.	Plan Approval No. 02184. Compliance shall be demonstrated by an AMS-approved stack test.
		(b) NOx emissions shall not exceed 12.32 tons per rolling 12 month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	VOC emissions	(c) VOC emissions shall not exceed 0.17 tons per rolling 12 month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	Operational Limits	(d) Firing duty shall not exceed 97.0 MMBtu/hr on a daily average basis.	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94 for (d).
		(e) Firing duty shall not exceed 849,720 MMBtu on a rolling 365-day basis.	Application

10. The 870 H-2 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 870 LSG Unit listed above including the installation of the new splitter tower is complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
870 H-2	NOx emissions	(a) NOx emissions shall not exceed 0.035 lb/MMBtu based on the average of three stack test runs.	Plan Approval No. 02184. Compliance shall be demonstrated by an AMS-approved stack test.

		(b) NOx emissions shall not exceed 6.50 tons per rolling 12 month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	VOC emissions	(c) VOC emissions shall not exceed 0.21 tons per rolling 12 month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	Operational Limits	(d) Firing duty shall not exceed 53.0 MMBtu/hr on a daily average basis.	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94
		(e) Firing duty shall not exceed 464,280 MMBtu per rolling 365-day period.	Application.

11. The 870 H-3 heater shall not exceed the following limits:

Source	Parameter	Limit	Notes
870 H-3	NOx emissions	(a) NOx emissions shall not exceed 0.03 lb/MMBtu based on the average of three stack test runs.	Best Available Technology (BAT), assures compliance with 40 CFR 60.102a(g)(2)(i)(B). Compliance shall be demonstrated by an AMS-approved stack test.
		(b) NOx emissions shall not exceed 11.96 tons per rolling 12 month period.	Application. Initial compliance determination shall be demonstrated by an AMS-approved stack test.
	CO emissions	(c) CO emissions not exceed 11.96 tons per rolling 12 month period.	Application. Initial compliance shall be demonstrated by an AMS-approved stack test.
	Operational Limits	(d) Firing duty shall not exceed 91.0 MMBtu/hr on a daily average basis.	Application.

		(e) Firing duty shall not exceed 797,160 MMBtu per rolling 365-day period.	

12. The 1332 H-2 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 1332 hydrobon reactor system listed above are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
1332 H-2	NOx emissions	(a) NOx emissions shall not exceed 0.04 lb/MMBtu based on the average of three stack test runs. (b) NOx emissions shall not exceed 10.51 tons per rolling 12-month period.	Plan Approval No. 05124. Compliance shall be demonstrated by an AMS-approved stack test.
	VOC emissions	(c) VOC emissions shall not exceed 1.36 tons per rolling 12-month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	Operational Limits	(d) Firing duty shall not exceed 60.0 MMBtu on a daily average basis .	Reasonably Available Control Technology (RACT) 25 Pa. Code §§129.91 through 129.94
		(e) Firing duty shall not exceed 525,600 MMBtu per rolling 365-day period.	Application.

13. The 1332 H-3 heater shall not exceed the following limits. These limits will not go into effect until the modifications to the Unit 1332 hydrobon reactor system listed above are complete and the unit has commenced operation in the Tier 3 configuration.

Source	Parameter	Limit	Notes
1332 H-3	NOx emissions	(a) NOx emissions shall not exceed 17.67 tons per rolling 12-month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.
	VOC emissions	(b) VOC emissions shall not exceed 0.97 tons per rolling 12-month period.	Application. Compliance shall be demonstrated by an AMS-approved stack test.

	Operational Limits	(c) Firing duty shall not exceed 43.0 MMBtu/hr on a daily average basis	Application.
		(d) Firing duty shall not exceed 376,680 MMBtu per rolling 365-day period.	Application.

14. PES shall not permit at any time the emission into the outdoor atmosphere of any malodorous air contaminants, in such a manner that malodors are detectable outside its boundary. [25 Pa Code §123.31(b)]

Work standard practices

15. The Permitee shall operate the facility consistent and within the projected future actual emission basis contained in the Plan Approval Application.

16. Each process heater or combustion unit shall only burn natural or refinery gas.
    (a) Each heater shall not burn any fuel has that contains H_2S in excess of 230 milligrams per dry standard cubic meter (mg/dscm) or 0.10 grains per dry standard cubic feet (gr/dscf). [40 CFR 60.104(a)(1), Consent Decree Order 05-CV-02866]
    (b) The span value for this instrument is 425 mg/dscm H_2S.

17. The 870 H-3 Heater shall be installed with ULNB meeting the NOx emission limit in Condition 11(a). [Best Available Technology (BAT), 25 Pa. Code §127.1]

18. Heaters 864 PH-1, 864 PH-7, 864 PH-11, and 864 PH-12 shall be each be installed with low NOx burners (LNB) meeting the NOx emission limits of Conditions 5(a), 6(a), 7(a), and 8(a). [Application] .

19. Pumps handling volatile organic compounds with a vapor pressure of greater than 1.5 psi (10.3) at actual conditions shall have mechanical seals. For the purpose of determining vapor pressure, a temperature no greater than 100 Fahrenheit shall be used. [25 Pa Code §129.55(b)]

20. Purging of volatile organic compounds during depressurization of reactors, fractionating columns, pipes or vessels during shutdown, repair, inspection or startup shall be performed in a manner as to direct the volatile vapors to a fuel gas system, flare, or recovery system until the internal pressure in such equipment reaches 19.7 psia (136 kilopascals) [25 Pa Code §129.55(d)]

21. The Permittee shall conduct a tune-up on each process heater annually as specified in 40 CFR 63.7540. For new heaters, this requirement begins within 180 days of start-up.
    (a) Each tune-up shall include: [40 CFR 63.7540(a)(10)]

(i) As applicable, inspect the burner, and clean or replace any components of the burner as necessary (the Permittee may delay the burner inspection until the next scheduled unit shutdown). If entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment.

(ii) Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available.

(iii) Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly (the Permittee may delay the inspection until the next scheduled unit shutdown).

(iv) Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available, and with any NO_X requirement to which the unit is subject.

(v) Measure the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made). Measurements may be taken using a portable CO analyzer.

(A) The Permittee may delay the burner inspection for the boiler with continuous oxygen trim system specified in Condition 19(a)(i) until the next scheduled or unscheduled unit shutdown, but you must inspect each burner at least once every 72 months. [40 CFR 63.7540(a)(12)]

(B) If the unit is not operating on the required date for a tune-up, the tune-up must be conducted within 30 calendar days of startup. [40 CFR 63.7540(a)(13)]

22. PES shall comply with the following for fugitive sources:

(a) No person shall cause, suffer, allow or permit volatile organic compounds (VOC) to be emitted from leaking flanges, gaskets, seals, connections, joints, fittings or other process equipment components not involving moving parts, nor shall any person cause, suffer, allow or permit VOC to be emitted from leaking valves, pumps, compressors, safety pressure relief devices or other process equipment components involving moving parts such that: [AMR V, XIII]

(i) The VOC emission from any leaking process equipment component results in a VOC in air concentration of 10,000 parts per million by volume (ppmv), or greater, when measured by test methods approved by the Department; or

(ii) The VOC emission is in a liquid state at the point(s)of discharge into the atmosphere.

(b) PES shall comply with the requirements of 25 PA Code §129.58.

Testing Requirements

23. For each of the Unit 864 heaters (PH-1, PH-7, PH-11, and PH-12), within 60 days of achieving maximum capacity, but no longer after 180 days of installing the low NOx burners, the Permittee shall conduct NOx and CO stack tests to determine compliance with the emission limits in Conditions 5(a), 5(c), 6(a), 6(c), 7(a), 7(c), 8(a), and 8(c). NOx and CO tests must be conducted simultaneously.

24. For Unit 870 H-1 and H-2 Heaters, within 60 days of completion of the Tier 3 project, the Permittee shall conduct NOx and VOC tests to verify that emissions do not exceed the emission factors in Conditions 9 and 10.

25. For Unit 870 H-3 Heater, within 60 days of achieving maximum capacity, but no longer than 180 days after start-up, the Permittee shall conduct NOx and CO stack tests to determine compliance with the emissions limits in Conditions 11(a), 11(b), and 11(c). The NOx and CO tests must be conducted simultaneously.

26. For the Unit 1332 H-2 and H-3 Heaters, within 60 days of completion of the Tier 3 project, the Permittee shall conduct NOx and VOC tests to verify that emissions do not exceed the emission factors in Conditions 12 and 13.

27. The source test shall be consistent with U.S.E.P.A. designated test methods and 25 PA Code §139. The Permittee shall submit a test protocol to AMS for approval at least 30 days before the test date. The test report shall be submitted to AMS within 60 days of completing the stack test. The following performance tests methods shall be used to demonstrate compliance with the emission limitations:
    (a) U.S.E.P.A. Reference Method 7E shall be used for nitrogen oxides.
    (b) U.S.E.P.A. Reference Method 10 shall be used for carbon monoxide.
    (c) U.S.E.P.A. Reference Method 25A shall be used for volatile organic compounds.

28. If at any time AMS has cause to believe that air contaminant emissions from any source(s) listed in the Plan Approval may be in excess of the limitations specified in this permit, or established pursuant to, any applicable rule or regulation contained in 25 PA Code Article III, the Permittee shall be required to conduct whatever test are deemed necessary by AMS to determine the actual emission rate(s).

Monitoring and Recordkeeping Requirements

29. The Permittee shall operate, calibrate and maintain an instrument for continuously monitoring and recording the concentration by volume (dry basis) of H_2S in the fuel gases before being burned in any fuel gas combustion device in accordance with 40 CFR 60.106(e)(1) and 25 PA Code Chapter 139.
    (a) The Permittee shall install a new continuous H_2S monitor and recorder for the fuel gases burned in the 870 Heaters H-1, H-2, and H-3. A Phase I application will be submitted to and approved by AMS prior to installation in accordance with 25 PA Code Chapter 139 and the PA Continuous Monitoring Manual, Revision 7.
    (b) Fuel gas combustion devices having a common source of fuel gas may be

monitored at one location if monitoring at this location accurately represents the concentration of H_2S in the fuel gas burned.

(c) The performance evaluation of the H_2S monitor shall use Performance Specification 7, Method 11 shall be used for conducting the relative accuracy evaluations.

30. The Permitee shall monitor and keep record the following:

(a) For the 864 Heaters PH-1, PH-7, PH-11, and PH-12, rolling 12-month NOx and CO emissions calculated monthly to demonstrate compliance with the 12 month rolling period emission limits for NOx and CO. Compliance determination shall be based on AMS-approved stack tests.

(b) For the 870 H-1 and H-2 Heaters, monthly records to demonstrate compliance with Conditions 9 and 10. Compliance determination shall be based on AMS-approved stack tests.

(c) For the 870 H-3 Heater, rolling 12-month NOx and CO emissions to demonstrate compliance with Conditions 11(b) and 11(c). Compliance determination shall be based on AMS-approved stack tests.

(d) For the 1332 H-2 and H-3 Heaters, monthly records to demonstrate compliance with Conditions 12 and 13. Compliance determination for the NOx and VOC emission limits shall be based on AMS-approved stack tests.

(e) The performance evaluation of the H_2S monitor shall use Performance Specification 7, Method 11 shall be used for conducting the relative accuracy evaluations.

(f) The Permittee shall monitor the refinery fuel gas heating value and consumption daily, when each heater is in operation.

(g) The Permitee shall keep records to demonstrate compliance with Condition 15 on a monthly basis in an AMS-approved format. Records shall include the projected future actual emissions listed in the Plan Approval Application, monthly emissions, rolling 12-month emissions, and the calculation method.

(i) For units where potential emissions were used as projected actual emissions in the application, monthly and rolling 12-month emissions are only needed if there was a malfunction or other incident during the period where actual emissions were higher than the emission factor in the application. Otherwise, potential emission calculations are sufficient.

(h) For tune-ups conducted on the heaters as per Condition 19: [40 CFR 63.7540(a)(10)(vi)]

(i) Maintain on-site and submit, if requested by EPA or AMS, a report containing the following information:

(A) The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the boiler or process heater;

(B) A description of any corrective actions taken as a part of the tune-up; and

(C) The type and amount of fuel used over the 12 months prior to the tune-up, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel used by each unit.

All records shall be kept for a period of five years.

Reporting Requirements

31. PES shall submit CEM and production reports to Air Management Services on a quarterly basis in accordance with 25 PA Code Chapter 139 and the PA Continuous Source Monitoring Manual.

32. Notifications required under 40 CFR 63 Subpart DDDDD, 40 CFR 60 Subpart J, and 40 CFR 60 Subpart Ja.

33. Any notifications required, as a result of any condition herein should be directed to Chief of Source Registration, Air Management Services, 321 University Avenue, Philadelphia, PA 19104.